

The United States of America



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Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

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If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.

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T. Todd Tschumi

Commissioner of Patents and Trademarks

Pamela L. Morton
Attest

JC675 U.S. PTO
09/998637





US005996431A

United States Patent [19]
Pierce

[11] **Patent Number:** 5,996,431
 [45] **Date of Patent:** Dec. 7, 1999

[54] **TWIST ACTION FRICTION DRIVE**

61038256 2/1986 Japan.

[75] **Inventor:** Michael George Pierce, Bedford,
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OTHER PUBLICATIONS

Marks' Standard Handbook For Mechanical Engineers, 10th
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[21] **Appl. No.:** 09/051,248

[22] **PCT Filed:** Apr. 30, 1997

[86] **PCT No.:** PCT/GB97/01174

§ 371 Date: Apr. 2, 1998

§ 102(e) Date: Apr. 2, 1998

[87] **PCT Pub. No.:** WO98/10206

PCT Pub. Date: May 12, 1998

[30] **Foreign Application Priority Data**

Sep. 6, 1996 [GB] United Kingdom 9618642

[51] **Int. Cl.⁶** F16H 21/16

[52] **U.S. Cl.** 74/25; 74/89

[58] **Field of Search** 74/25; 89; 60;
 384/100

[56] **References Cited**

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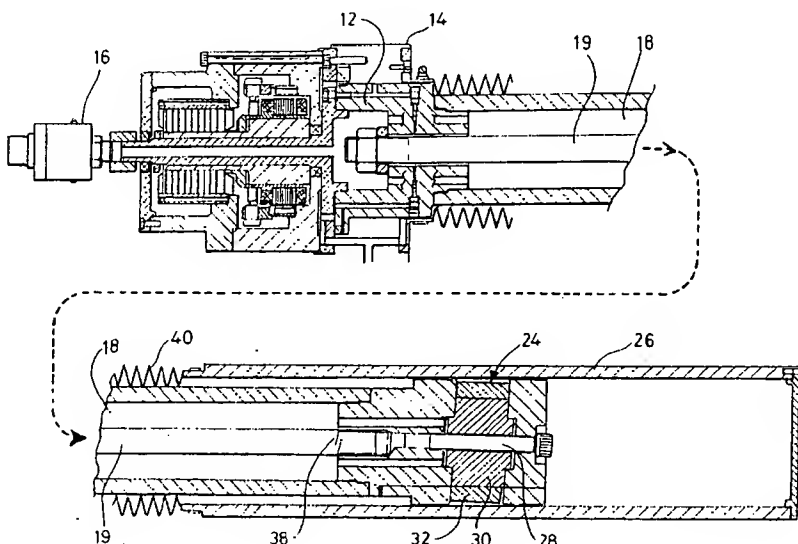
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[57] ABSTRACT

A twist action roller friction drive comprises a rotating drive bar which drives, in rotation a roller the axis of rotation of which is inclined relative to the axis of a rotationally fixed driven member with which the roller engages. The inclined roller comprises a single annular roller urged from the inside into driving contact with the driven member by one or more hydrostatic pads. The driven member is a tube and the skewed annular roller is in frictional engagement with the bore of the tube. In a typical use, the tube is fixed to the carriage of a machine tool and is aligned with the machine axis. Oil for the hydrostatic pad(s) acting on the roller is supplied through the drive bar along the axis thereof. At its trailing end, the drive bar rotationally drives a skewed roller assembly in which the annular roller is incorporated, the remote forward end of the drive bar being driven in rotation, as by an electric motor. Axial movement of the driven member is principally determined by the angle of skew of the roller so that if this angle is made very small, similarly small precise axial movements of the driven member of as little as 1 nm (nanometre) or less can be readily achieved, per revolution of the drive bar. This permits a high speed drive motor and in turn velocity feed back control.

17 Claims, 4 Drawing Sheets



ARTIFACT SHEET

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March 8, 2004